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Case study

Postoperative immobilisation orthosis for surgically corrected hallux valgus

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Abstract

A postoperative immobilisation orthosis was developed at the School of Physical Therapy and Rehabilitation, Department of Orthotics and Prosthetics, and applied from the first postoperative day as an alternative device for ambulation of patients who have undergone hallux valgus surgery while maintaining the corrected position. The orthosis is constructed with polyethylene thermoplastic sheet of 3mm thickness and Velcro. During the ambulation period, there was no complication or complaint due to its application and the position of the great toe was maintained. The time of the orthotic application was six weeks. The orthosis has allowed patients to walk with full weight bearing from the postoperative first day without any complication or recurrence.

Introduction

Hallux valgus is one of the most common foot deformities among those who wear shoes (Torkki *et al.*, 2001). The common goals of more than 100 techniques that have been introduced for correction of hallux valgus are sufficient correction, reduced risk of arthrodesis in first metatarsophalangeal joint and recurrence, and return of the patients to normal life without pain and limitation (Donatto *et al.*, 1992; Torkki *et al.*, 2001; Wulker, 2000). Maintenance of the surgically corrected position is a vital part of overall treatment that is achieved only by accurate and adequate postoperative immobilisation (Donatto *et al.*, 1992).

A postoperative immobilsation orthosis was designed to replace the plaster cast which was found to be uncomfortable did not allow inspection of the surgery site and permit wound care. The plaster cast limited ankle joint motion and the orthosis was designed as an alternative to other applications (Donatto *et al.*, 1992; Miller and Horne, 1985.) The main purposes of the orthosis were the earliest mobilisation of patients who had undergone surgery for hallux valgus correction from the first postoperative day with full weight bearing and with free ankle joint for range of motion. It would also allow wound care can exercise regimen by easy donning and doffing.

Technique

The orthosis is constructed from polyethylene thermoplastic sheet of 3mm thickness and a Velcro strap. A positive plaster model was constructed from the surgically corrected foot when the patient transferred from surgery room to ward (Fig. 1). Sufficient size of polyethylene

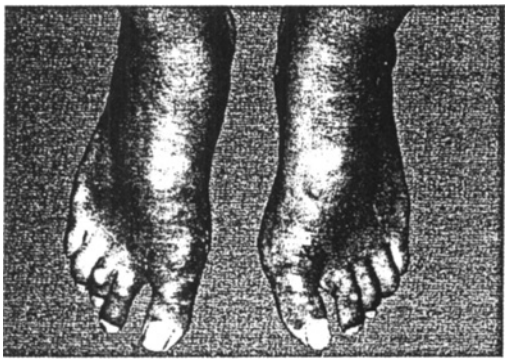


Fig. 1. Surgically corrected hallux valgus.

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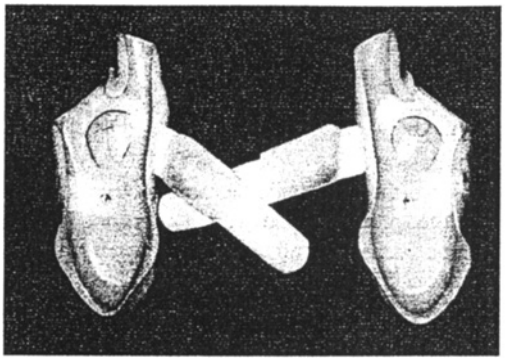


Fig. 2. PIO with transverse arch and first metatarsophalangeal jont supports.



Fig. 3. Dorsal view of applied orthosis.

sheet was heated and moulded on a positive plaster model, and trimmed at the level of malleolus, and second to fifth metatarsophalangeal joints under the foot. The medial side of the orthosis is kept longer to cover the great toe from medial, plantar and lateral sides to maintain the corrected position. It has also been shaped to support especially the distal transverse metatarsal arch to shift the weight from the first metatarsal head to other metatarsal shafts for full weight bearing purpose (Fig. 2). The orthosis is then stabilised to the foot by the Velcro straps.

Case report

A 52 year old female patient with bilateral hallux valgus deformity was assessed. Measured hallux valgus angles were 57° on right great toe, and 40° on left great toe. Intermetatarsal (IM) angles were measured as 13° and 14° respectively.

A McBride operation and bunionectomy for the right side, and a modified McBride procedure for left side were applied as the surgical techniques. Postoperative hallux valgus angles were measured as 27° on both right and left sides. IM angles were also measured as 8° and 13° respectively.

With the orthosis applied after surgery (Figs. 3 and 4), the patient was allowed to walk postoperatively on the first day. The orthosis was applied for 6 weeks until solid fusion had been obtained (confirmed radiographically). Exercises for second to fifth toes and ankle joints were also encouraged from postoperative first day. Great toe mobilisation exercises were included when the immobilisation period was over and the orthosis taken off.

Measurements at the end of the orthotic application showed that there was no change in postoperative HV and IM angles. Therefore any recurrence was not detected, and the postoperative position has been maintained. During the ambulation period, there was no complication or complaint due to orthotic application and the position of the great toes resulted in tolerable pain at the early postoperative stage.

Discussion

It has been agreed that the best correction obtained in hallux valgus surgery is at the time of operation. Maintenance of the correction that is achieved by accurate and adequate postoperative immobilisation is also as important as the surgery itself. Plaster cast is a regular immobilisation method after hallux valgus surgery and should be changed every time it becomes loose due to decrease in foot swelling, to maintain adequate position, and to permit wound care (Donatto *et al.*, 1992; Ramanathan and Heywood-Waddington, 1988).

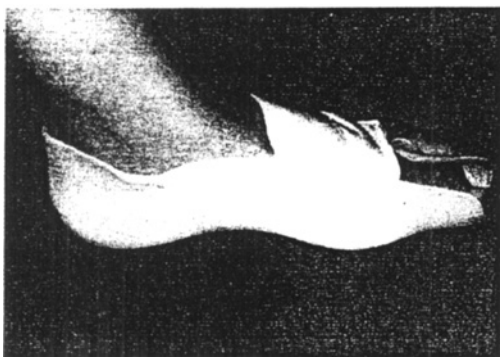


Fig. 4. Medial view of applied orthosis.

Donatto *et al.* (1992) have used compression dressing for the first two weeks and continued for the next six weeks with a custom moulded orthosis designed specially for postoperative hallux valgus immobilisation. The splint was worn during walking and sleeping times, and was removed for hygiene purpose only. There is no information from their research on whether the patients were allowed to walk with full or partial weight bearing. Miller and Horne (1985) applied a specially designed orthosis 2 or 3 days postoperatively and they allowed the patient to walk with full weight bearing.

In contrast to the Donatto *et al.* and Miller and Horne's studies, the orthosis in this case study has been applied postoperatively, on the first day. The design of the orthosis with distal transverse metatarsal arch support prevents the loading of first metatarsal bone and shifts the weight from first metatarsal head to other metatarsal shafts to allow the patient to walk with full weight bearing. Since the early mobilisation and weight bearing of the patients with surgically corrected hallux valgus are counted as an important part of the overall management, it is suggested that this orthosis may reduce the risks of possible complications due to inactivity and allow the patients to return to normal life earlier. The time of orthotic use in the case reported was 6 weeks while 6 to 8 weeks support with plaster is advised by Ramanathan and Heywood-Waddington (1988). The orthosis does not cover the ankle joint and limits the range of motion in this joint. Donning and doffing by either the therapists or clinician was easy for wound care and exercising. It has been also observed that the patient was performing basic activity of daily living without any disturbance.

Conclusion

This orthosis appeared as an effective solution for the patients who had undergone hallux valgus surgery and need to be ambulated immediately after the surgery to reduce the complications because of immobilisation while maintaining the corrected position. However, further research with larger numbers of patients is required to investigate its clinical advantage.

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